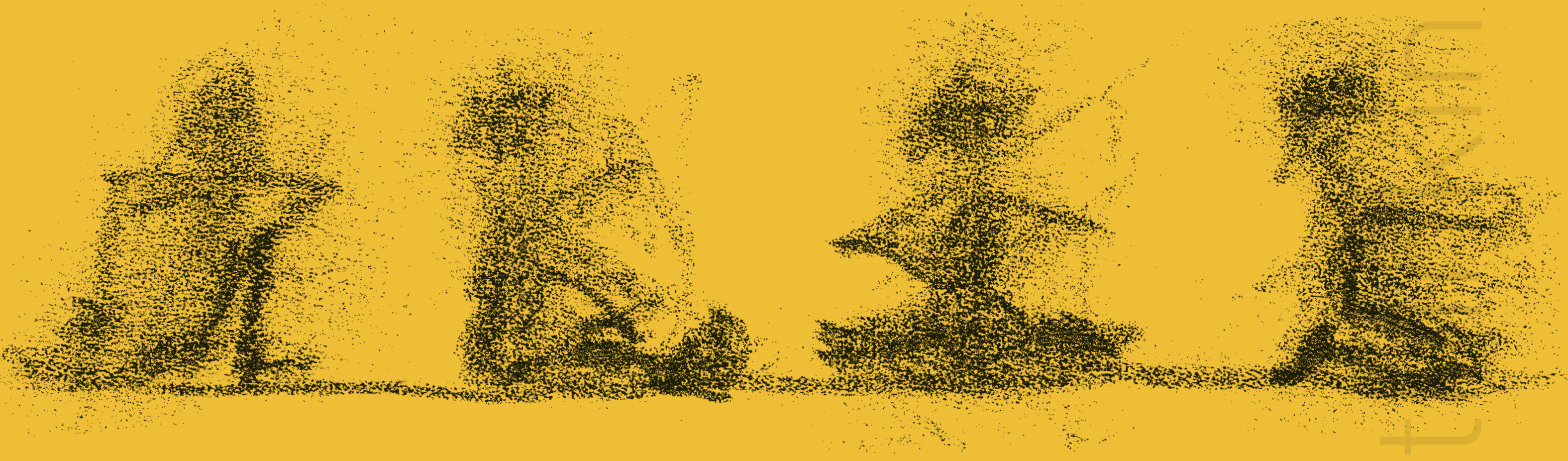
rethinking sitting



chapter 1

why – backdrop

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Our active past

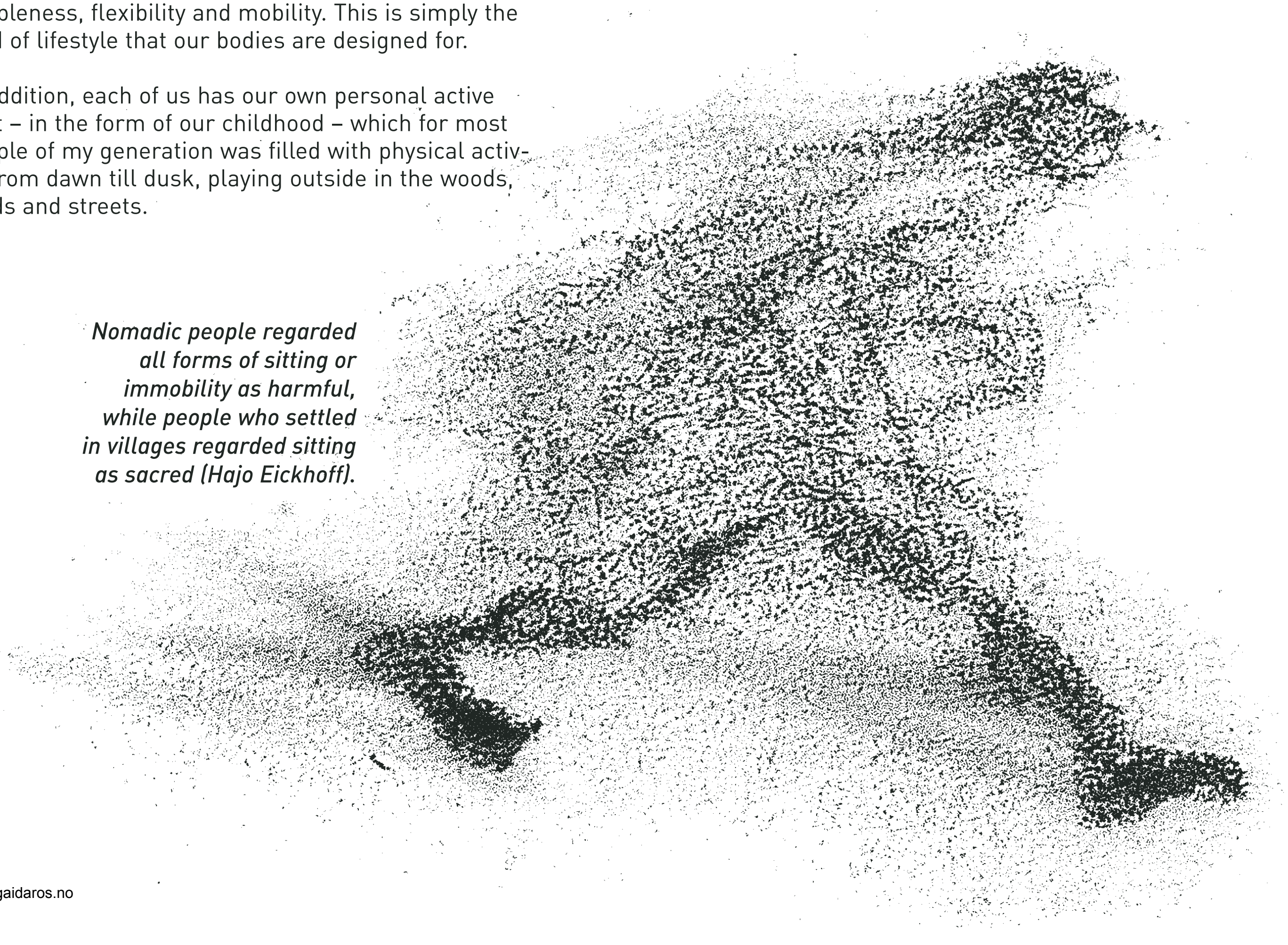
How has the human race fared so far?
In the Stone Age and in nomadic societies, people led physically active lives.

Constant walking, hunting and picking things up off the ground and down from trees were prerequisites for finding food. Even after people began to settle into agricultural societies with permanent abodes, the physical labour necessary for survival depended upon a varied use of the body – of the head, trunk and limbs and of the muscles and joints.

Over thousands of years, our bodies have tried to satisfy our needs by providing us with strength, speed, suppleness, flexibility and mobility. This is simply the kind of lifestyle that our bodies are designed for.

In addition, each of us has our own personal active past – in the form of our childhood – which for most people of my generation was filled with physical activity from dawn till dusk, playing outside in the woods, fields and streets.

Nomadic people regarded all forms of sitting or immobility as harmful, while people who settled in villages regarded sitting as sacred (Hajo Eickhoff).



Our passive present

Recently, however, across large parts of the globe, lifestyles have changed radically and have become much more sedate. There is less variety in the kinds of physical tasks we expect our bodies to perform. For some groups of people, this change started some 5 000 years ago; for others, the change came a mere 50 years ago. Although we can regard these changes as a long process in historical terms, 5 000 years is in fact just a tiny fraction of human history. An all-pervasive change in the way we live has thus occurred in what amounts to a blink of the eye, when viewed from the perspective of the evolutionary history of the human body.

Many children, for example, experienced a sudden change in lifestyle. From being participants throughout their youth in the active and varied life of their adult role models, the young now belong to societies which have obligatory schooling.

Being required to sit at a school desk for large portions of the day represented a great change in itself, and the situation was not made better by the fact that the ideal pupil in most societies was the one who sat as still as possible! At the beginning of the 1800s, the school system in Prussia was based on a military model. Classes were called in for compulsory schooling. The expression "Prussian discipline" reveals the adult view of restless pupils during that era.

Just a few years ago, we had to stand up to change television channels; today we do this by remote control.

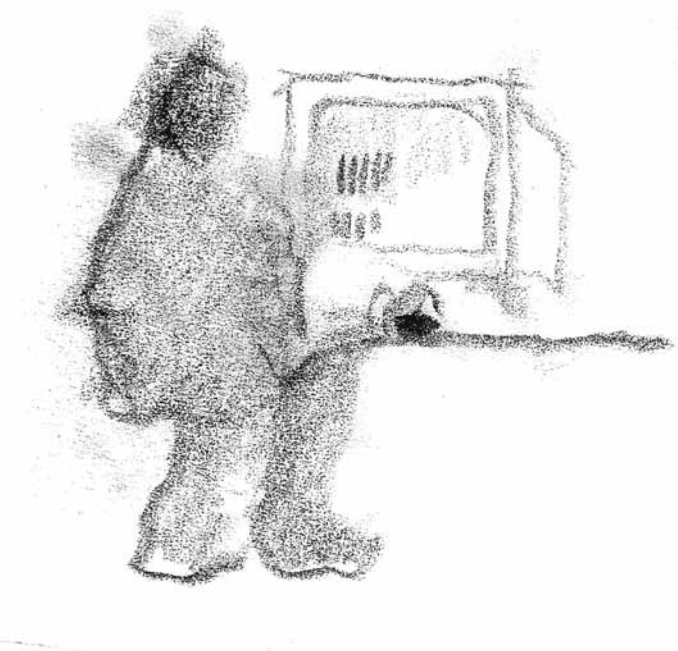
Post-industrialized societies

Physical mobility began to decrease with the advent of industrialized and subsequently post-industrialized societies. We move less and less, as our work is often stationary and involves repeating the same movement again and again, for hours on end, day after day. We have abandoned varied use of our bodies, and for most of us, hard physical exertion is no longer essential to our survival. On the contrary, we invest both money and creativity in eliminating reasons for normal and positive use of the body. Doors open automatically, escalators replace stairs, moving walkways reduce the number of steps we have to take at the airport, ski lifts pull us up to the top of the slalom slope, drive-in fast food outlets mean we can get dinner without getting out of the car – we even have electric toothbrushes to prevent our arms from getting tired in the name of dental hygiene.

Staring at a screen for hours on end is a relatively new activity that is spreading like wildfire. First there was the television screen, then the computer screen, and now we are seeing the advent of miniature portable screens in the form of palmtops and mobile phones everywhere. Our eyes are designed to alternate between looking down and scrutinizing something we have in our hands and looking up at far-off objects in the natural surroundings. Spending large portions of our day staring at a screen that is a fixed distance from us entails a lack of variation not only for our eyes but also for our posture. If you include all the screens you look at, from the TV at home, in the café, on the train or wherever, to the PC at work, etc., this can easily add up to more than 50% of our day being spent in front of a screen.

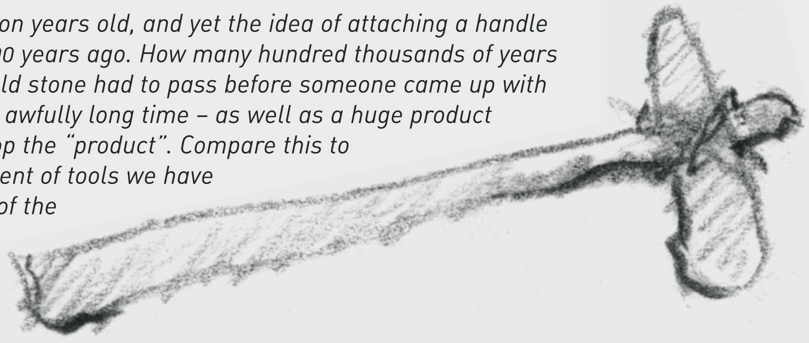
Just a few decades ago, most children walked or rode bicycles to school and spent much of their free time playing outdoors in the garden or in the street. Nowadays, it is not uncommon for children to start the day with cartoons on television at breakfast time. Soon they will be able to watch films on the school bus, too. Teaching is increasingly screen-based, and children also spend a lot of their free time watching TV and playing computer games. All these changes mean children are less mobile than they used to be and their bodies are deprived of natural, innate and healthy activities.

Scientific papers and other research highlight the unhealthy way most of us are living, and results show that we are less active than we used to be. The gap between people who are physically active and those who are not is widening. An increasing proportion of the population is now much less active than was the case just a few decades ago. Military recruits are in worse physical condition than they once were, and the average weight of forty-year-olds has increased dramatically, despite a lower calorie intake.



Tools

Homo habilis is over two million years old, and yet the idea of attaching a handle to a stone occurred only 30 000 years ago. How many hundred thousands of years of hammering with a hand-held stone had to pass before someone came up with the idea of the axe? It took an awfully long time – as well as a huge product development team – to develop the "product". Compare this to the extremely rapid development of tools we have experienced in the rich parts of the world over recent centuries.



What is the cause of this new lack of mobility and variety? Should we blame our tools?

When Homo habilis started using tools, this marked the beginning of a new era fostering a new lifestyle, which unfortunately for many of us has led to monotony and passivity.

Most tools or equipment are intended to make our lives easier, more efficient and more comfortable. The stone axe made it easier to cut trees, the plough simplified farming, the bow and arrow made hunting more efficient, and so on. We should, of course, be grateful for all the strenuous labour that our tools have eliminated and for the improved standard of living they provide us. As a designer, I feel it is important to examine both the negative and positive effects that tools have on our lives. We need to be aware of all of the possible consequences that tools may cause for our bodies and the way we live.

The negative aspects of exaggerated and monotonous use of tools can be grouped into two major categories: load and repetition. The 100 female skeletons dating back 10 000 years that were found some time ago in Northern Syria had deformed toes, backs and knee joints. The women suffered from occupational musculoskeletal disorders as a result of poor posture and the repetition of movements.

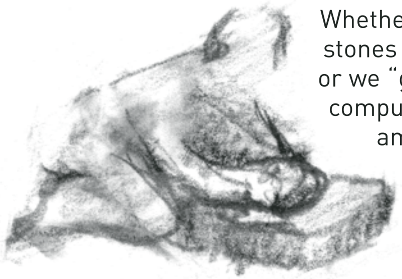
For society, the invention of a device to grind corn was a major leap forwards, but for the individuals who performed this monotonous work, using the tool as part of a specialized division of labour, this contraption entailed a serious deterioration in their quality of life.

Excessive physical labour
It is probably safe to assume that in "pre-tool" societies, hard physical labour seven days a week was the main cause of many aches and pains. Or perhaps most work-related injuries in former times were caused by accidents.

Monotony
The widespread use of tools, machines and motorized forms of transport entailed fewer opportunities for varied use of the body, and greater monotony. This in its turn became the main agent of muscular and skeletal damage especially for people who use the same tools again and again over long periods of time.

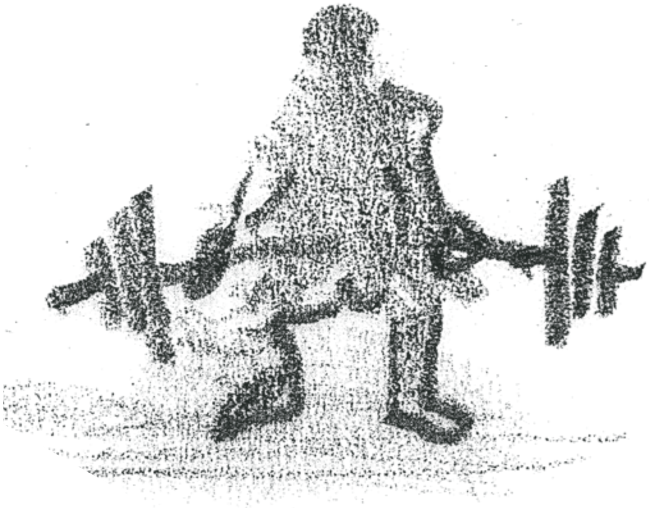
Passivity
Nowadays this trend poses the main challenge in connection with occupational musculoskeletal disorders. Small muscles are used excessively and suffer overload, while the bigger muscles are hardly used at all. Active muscle work has been replaced by static work, and our bodies tolerate static use very badly, and they protest with pain. The stage is set for this to continue: more and more of us will do less and less physical labour, and our physical activities in general will be too few to keep our bodies in optimal working order.

The transition to extensive use of tools does not always lead to a better existence for the human body. It is probably better for our health to walk than to drive a car. It may be more natural for the human body to deliver a message in person than to use the various forms of transmission that began with a chisel and rock, continued via brushes, quills, pens and pencils and has culminated in the typewriter and computer, palmtops and SMS text messages. Time and again we have seen that the latest and most efficient solutions become a bane if we use them for hours and hours every day.



Whether we use two stones to grind corn, or we "grind" using the computer mouse, it amounts to the same thing. The only difference is that different parts of our body are affected.

The trend brought about by the car industry is another interesting example. In the first place, the car renders obsolete the activities we would have used to get from A to B, such as walking or riding a bike. But the ways in which we are made passive don't stop there. When we drive a car, some of the operations we perform are dynamic and are good for us, while others are static and cause problems. Depressing the clutch stretches out our left leg, we move our ankle, thereby improving blood circulation. Changing gear involves using our arm muscles, another positive aspect. We also used to get some variation from opening the window or the sunroof manually. But what did the car designers come up with? Exactly – they automated gearshifts, and clutching became unnecessary, and they introduced electric windows, making the driver as physically passive as possible.



Still, it is a high price we ultimately end up paying for removing the few arm-and-foot movements that were necessary to move mankind on four wheels. When we get home after a long drive, we have to spend our spare time "clutching and gearing" in the gym.

Nowadays, the frequency of muscle and joint injuries is increasing almost proportionally with the number of tools we use, begging the question as to whether Man is physically better equipped for life with tools, or without them?

Human life without the development of tools would entail the elimination of a key human characteristic: creativity. Creativity leads to new solutions that no one has seen before. We have an innate desire to improve things, as well as a fascination with the potential uses of completely new tools.

Of course I am aware that the general tendencies I have described above mostly apply to the so-called developed part of the world. Heavy and strenuous physical labour is a major problem for people in many professions, and the development of better tools that can alleviate their physical workload is still a very important task.

Sitting devices primarily intended for applications where users are seated over longer periods must be characterized as tools, and it is important to develop these in a way that minimizes the negative impact the tool may have on the user.

As designers, we must not focus one-sidedly on what these tools can do *for* us and forget to find out what they can do *to* us. Tools should serve the individual, the community and the environment – in both the short and long run.

In order to reintroduce meaningful physical activity in the workplace, we could try installing pedals and a dynamo under the desk, requiring the user to pedal in order to generate the electric power necessary to run the PC.

Sitting postures

In most ancient societies, sitting took up a very small part of an otherwise physically active existence. Throughout history, sitting postures, or the way we have placed our limbs while sitting, have varied from period to period, culture to culture, and continent to continent. Studies of the history of sitting have observed a connection between preferred different sitting postures and a number of social factors that affected the choice of these. Circumstances that affect sitting include the nature of one's work, climate, religion, hierarchy and perceptions of different social roles and functions.

In fact, our Western way of sitting is still far from being the norm. In some places, a cross-legged sitting posture is the most common; in others kneeling is preferred, and in yet others squatting is considered the most natural and comfortable.

Nomadic tribes, past and present, are obviously unable to cart a lot of furniture around with them, so the various postures that we refer to as sitting tended to take place on the ground or on the various formations that nature has to offer.

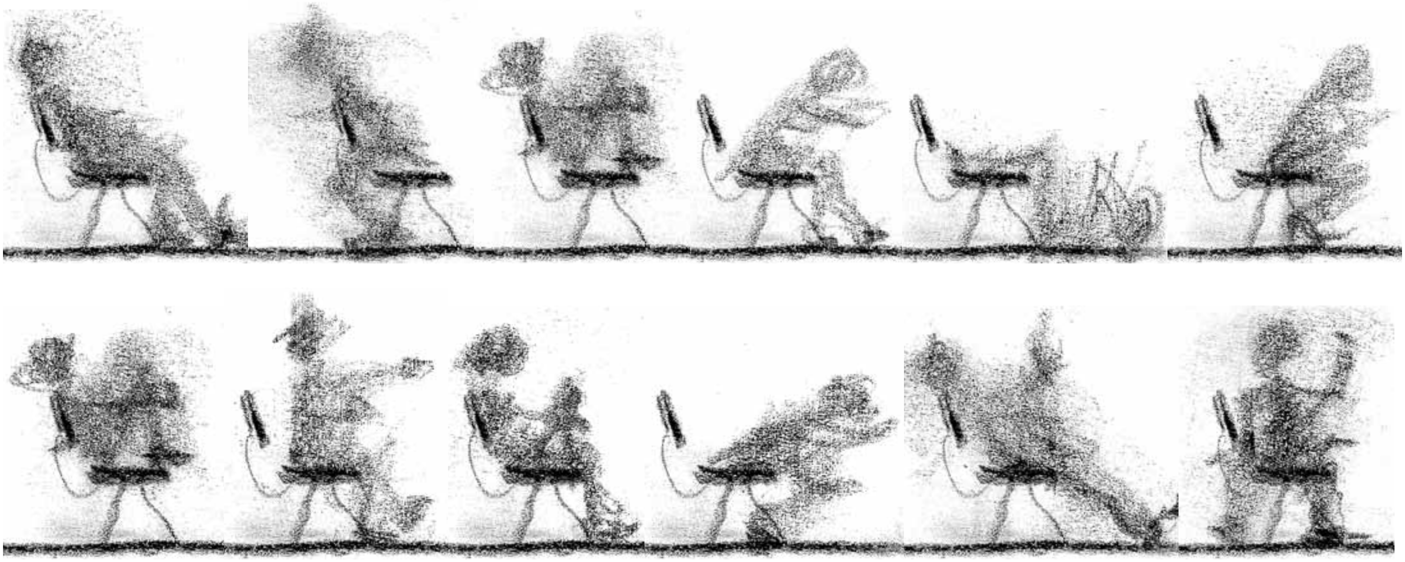
When the Stone Age man wanted to rest, he lay down wherever he could.

Pictures of Buddha provide perhaps the most famous images of a person sitting without any form of assistance.

Squatting, which is still widespread in Africa as well as in South Asia, may be seen as related to the human fight-or-flight reflex. It is an alert posture from which one can get on the move very quickly. This posture might have been the decisive factor in the event of an attack by an enemy or wild animal.

The formal Japanese kneeling posture, seiza, is a highly attentive posture and reflects Japanese norms of politeness.

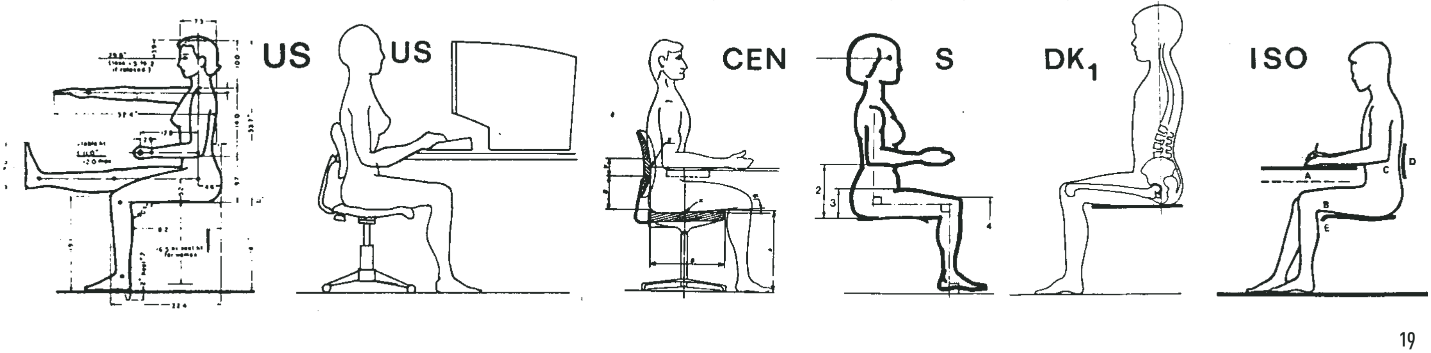
There are also gender differences in sitting: men tend to open up and spread out more while sitting, whereas women tend to keep their limbs closer to the body midline – although it is difficult to say whether this is innate or culturally defined as well-bred femininity.



Logically, there ought to be an even greater variety of sitting postures as a result of support devices such as the chair.

We know that the human body can command an enormous repertoire of sitting postures. So why did standardization committees around the world choose a single sitting posture as the starting point for their standards? This question is highly relevant, because sitting has become such a dominant part of our everyday lives.

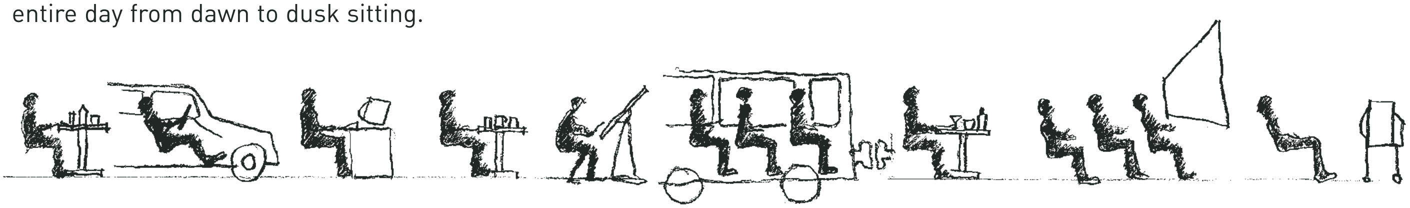
The ISO standard, CEN, US and S – all defined the perfect sitting posture as a right-angled, upright posture.



“Homo sapiens” has become “Homo sedens”

Sitting: term describing a number of postures between standing up and lying down.

If we consider for a moment what we do during the course of a day, we will discover that many of us spend a surprising amount of time in some kind of chair. An alarming number of people spend ¾ of their entire day from dawn to dusk sitting.



Our industrialized part of the world has turned into a society of sitting human beings. “Homo sapiens” has become “Homo sedens”.

Information technology has introduced some additional challenges to our life of sitting: the keyboard, mouse and screen demand active fingers, eyes and brain with the rest of the body in stand-by mode. This not only entails that we spend even more time sitting, but that our sitting has become even more static.

The human race has spent 99.99% of its time on this planet as active individuals. Why is it that we suddenly find ourselves stuck in some kind of seat all day long?

We sit down to eat breakfast, we sit while travelling, we sit as we work, we sit during our breaks, we sit down to eat dinner and then we spend a lot of our free time sitting in front of the TV.

Sitting on a seat – the message of language

In many languages, the verb "to sit" also signifies holding a position of power. Idioms such as "sit on a committee" and "sit in Parliament" say more about power than about sitting. Expressions such as a "seat of learning", "the sitting bishop" and "a sitting of the court", as well as "chairman", "parliamentary seats", "to be in the chair", "to take the chair", "to chair a meeting" and the "chair" all refer to social status and powerful positions.

These examples suggest that sitting postures and sitting traditions relate as much to social circumstances as to needs for physical support.

arliamentary seats
sitting bishop
chairman
sitting in the court
to be in the chair

The chair and the authority

The first formal sitting device may have been a stone or a tree stump where the leader of the tribe could sit on a higher level than the others when giving his instructions, the extra height lending him the authority he needed. Indeed, we might even ask whether status and authority were the primary functional requirements for the very first furniture designed for the seated position?

It has been widely accepted that the oldest chairs with a back and armrests date back to the age of the Pharaohs in ancient Egypt. Here is one theory as to why: in Europe it was generally easy to find a suitable object or mound in the terrain on which the leader could sit in a higher position than his subordinates, but in the desert this was more problematic. It was not easy to make a suitable platform out of sand, and so the Egyptians "invented" the chair.

Seductive as this theory is, it has since been discovered that the Egyptians were not the first people to sit on chairs. Archaeological finds in south-eastern Europe dating back some 5 700 years include depictions of people sitting on devices that can be called chairs. Another intriguing aspect of these findings is that they only show women sitting on chairs.

Historical depictions of various forms of leadership or hierarchies tend to show the "leader" figure placed higher up and in a larger chair than people of lower rank.

An important person was given his seat on a stage or podium, probably to ensure that his or her head was held higher than the heads of his subjects.

It is not difficult to understand that sitting on a carved object such as a bench, chest or stool lent the sitter more prestige than sitting on the ground or the floor. When chairs later on became a symbol of power, the back of the chair also played an important role, providing an impressive background and frame around the sitter.

If the sole purpose of sitting devices for figures of authority was to ensure leaders greater comfort, thrones would probably look quite different. Archaeological finds suggest that the ancient Pharaohs did not lean back against the vertical back of the chair. By sitting in a highly disciplined, upright fashion, the leader distanced himself from the more natural postures assumed by the lower classes. In Egypt, people also believed that an upright sitting posture enhanced contact with the higher powers.

In ancient Greece, the heavy throne or seat of honour seems to derive from Egyptian or Western Asiatic prototypes, but the Greeks took them to new heights

of grandeur and elaboration in the thrones they built for cult statues. As in Egypt, Greek chairs eventually began to assume freer, more practical forms, as is illustrated by the klismos, with its curved back and legs. The Romans went a step further in prioritizing freedom and comfort by adopting the lying position at the table.

However, despite these trends, the vertically backed chair continued to act as a symbol of official power, and this type of tall chair was still used as the symbol of power for both religious and secular leaders in Europe during the Middle Ages. Mediaeval churches can provide us with a lot of information about sitting, and I will be returning to this later.

From the Renaissance on, chairs of different types became more and more common, but they still remained the prerogative of the ruling classes. Renaissance chairs were status symbols and often resembled miniature thrones.

In recent history, the use of chairs has increased in most parts of the world. The rapidity with which this has happened and how widespread the use of chairs is varies from area to area and culture to culture, but as a general rule, one of the most important functions of chairs right up until the modern age has been to denote authority.

In the United States the term “executive chair” is currently used for an expensive work chair, but if you research the matter further to find out what is so “executive” about this chair, you will find that it is only the size. It would appear that the most important thing is for executives to have a higher seat back than their junior employees.

The Director’s chair is a well-known feature on film sets. It is not exactly magnificent, but the observant watcher will notice that there are not many other people on the set who have their own chairs. And should the Director’s chair become available, very few members of the crew would even consider sitting in it.

The industrial revolution and social mobility

The eighteenth century, with its rapid turnover of styles, also brought with it a more widespread use of chairs. Chairs were no longer the sole privilege of the aristocracy, but they were still more or less the privilege of the well-to-do.

Around 1830, the craftsman Thonet started making chairs by bending pre-steamed wood. These chairs became the forerunners of the bentwood furniture that conquered a huge portion of the European and American mass market during the second half of the century. Mass produced furniture was coming into its own, and chairs became a regular feature of every-day life for large segments of society in the industrialized world.

In the nineteenth century, the major changes brought about by industrialization led to chairs becoming a standard piece of equipment in the workplace, schools and private homes. However, it was not only the new means of production that caused the general spread of chairs. Industrialization also led to more and more people performing their work whilst sitting. It is clear that the factory worker's and the office worker's work chairs were designed according to the established chair standard, based on the accepted way of sitting in the upper echelons of society. No analyses were performed to determine which postures and ergonomic solutions were best suited to the work in question.

There were actually professions in the industrialized world, which for a long time resisted this rigid tendency and kept their particular work postures: tailors continued to sit in the tailor position, book keepers stood at high desks, cobblestone layers had their mushroom-shaped stools. However, these were the exceptions to the rule. In general, "elegant" body language and rules of etiquette emulated in the desire for upward social mobility may have been as decisive a factor in determining "sitting codes" as the shape of the chairs themselves.

The similarity between the Pharaoh's throne and the clerk's chair shows us how we took after upper class culture rather than trying to find good working postures when the modern chair was constructed. We kept on trying to emulate the Pharaohs, the mediaeval kings and the renaissance bourgeoisie.

Even in countries with very different ideals regarding what is the proper way to sit, the all-pervasiveness of Western culture has begun to prevail over local traditions. For example, in Japan, Western furnishings are taking over at the expense of rooms where normally the only sitting device is the tatami mat.

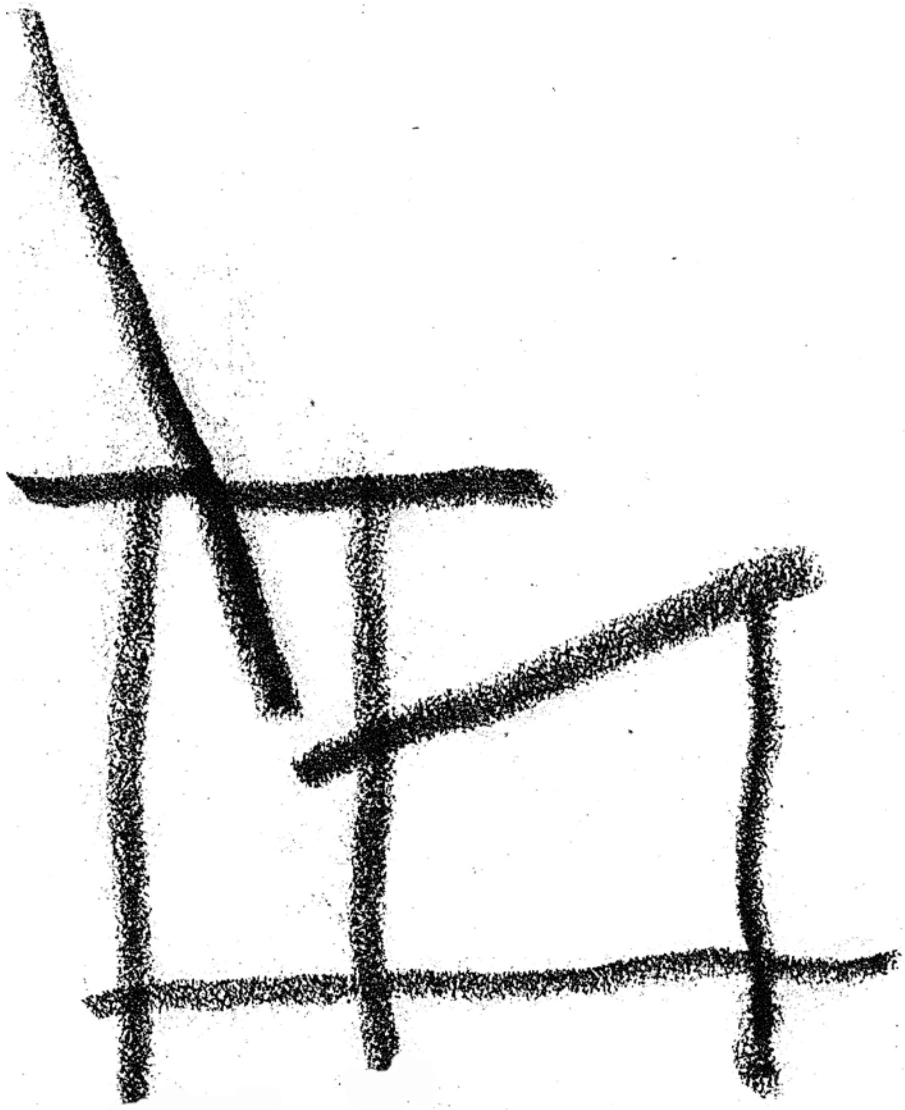
We noticed in the 1980s that when people in high positions choose our alternative sitting solutions, often the chairs without a back, this was probably done partly to signal a dynamic style of management and an anti-authoritarian attitude. Are the days when chairs were important signs of authority over?

How functional was functionalism?

As far as furniture for sitting is concerned, there are grounds to query whether the twentieth century's functionalism really did lead to more functional solutions for the user – the sitting human being. The new pieces got rid of a lot of unnecessary ornamentation and detail, and they certainly became simpler to manufacture and easier to clean. However, the basic concept of sitting was not subject to review. With a few notable exceptions, the focus was not on the needs of the human body while sitting. In this sense, most of the furniture produced in the functional era was not more functional than the styles it replaced. Remember that concepts like the rocking chair and tilting work chairs for offices were not created by the functionalists, but in the nineteenth century.

Nor was the Scandinavian Design movement in furniture design, to which I feel a close affinity in many ways, particularly concerned with the needs of the sitting human body. Qualities such as aesthetics, function, honest use of materials, attractive details, etc. were given equal weight. In many places where furniture is needed, the quality criteria of Scandinavian Design are still the best, but in areas of application where we sit over a long period of time, these qualities do not fulfil our physical needs.

The stylistic ideals for furniture for residential sitting that have come in the wake of functionalism have not managed – or even tried – to respond better to the needs of the human body. Neither the low sitting arrangements with an abundance of soft cushions nor the static minimalist chairs designed for sitting at a high table represent any major move towards a more body-friendly philosophy.



Learning from the first long-term sitters

Modern society results in many of us having to sit on chairs in order to get our work done. The sitting posture has historical roots based on selected social and cultural ideals. How might things have been different if we had turned to history and learned from earlier eras' "long-term sitters"?

In the past, too, there must surely have been people who had to sit while they worked, apart from the small elite group of authorities who sat in central positions of power. Is there anything we can learn from these people when designing sitting devices for today and for the future?

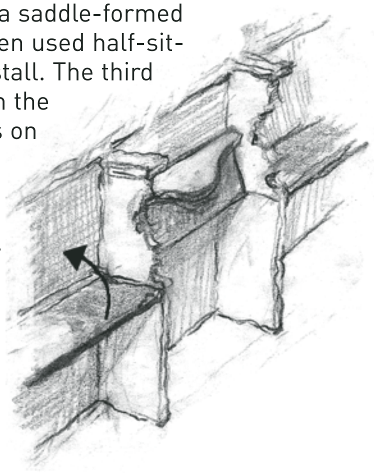
Riders, whether they rode oxen, donkeys, camels or horses, are undoubtedly among the earliest long-term sitters. Riders always sit with a good posture and a well-balanced upper body. However, the saddle was not a source of inspiration for chairs for factory workers. Indeed, even motorcyclists sit in a slumped posture, because the pedals are in "the wrong place", unlike the horse rider's stirrups.

Sculptures of people rowing river boats in days of yore reveal that the rowers alternated between sitting and standing. Monks sat at angled tables with their thighs sloping downwards. However, with the advent of the industrial revolution, it was not these groups of workers who were used as models for work postures and the shaping of the office chair. Instead, middle-class dining chairs were chosen as the prototype.

Since monasteries were probably among the first places where people sat for extended periods of time for the purpose of working or learning, it is perhaps not so strange that Benedict of Nursia (480–547) compiled guidelines for the postures monks should assume.

While the congregation stood in churches until after the Reformation, the clergy, several hundred years earlier, felt the need to sit. They could easily have fixed this problem by installing stools, benches or chairs, but they chose not to do so. Instead they constructed an advanced sitting system with a hinged seat, known as a misericord. These chairs were constructed for three different body postures: in addition to sitting on a flat seat, the hinged seat could fold up against the wall exposing a saddle-formed seat that gave support when used half-sitting, half-standing in the stall. The third posture was standing, with the option of leaning forearms on support plates situated on either side of the seat.

What seems utterly amazing is that at that time, they not only designed the physical solution, i.e. the seat, but also – after the congregation was given the opportunity to be seated – they achieved variation of posture by reorganizing the time spent in church through the now-familiar church rituals.



Rowing a river boat, varying between sitting and standing.

Coachmen's seats sloped forwards, and there were footrests at several different levels in front of the driver.

The way in which sitting was organized in churches in the Middle Ages is in concord with the philosophy that has come into fashion during the last decade. If we had learnt our lesson from our elder forbears, things might have been very different today.

Rituals – the solution to an ergonomic problem?

"Please, take a seat!" is one of the first things we say when we receive a visitor – at work or at home. Perhaps we should introduce more variety into these "rituals"? "How about starting the meeting with a walk?" "Please, lie down!" "Let's talk at the standing table".

Church rituals were developed requiring worshippers to alternate between different bodily postures and thus provided the opportunity for movement and variation that facilitated getting through the long service: standing to sing, kneeling to pray...

When I was a child, we had to stand up when the teacher entered the room, when we were asked about our homework and when we had to recite a poem or read something aloud. We also stood to sing. This traditional alternation bears witness to the fact that the need for a variety of movements and changes in bodily posture was widely understood in the past, and indeed up until quite recently.

There is a movement now in occupational ergonomics to reintroduce "rituals" in order to bring back some of the movement and variation our bodies need. For example, the photocopier, coffee machine and fax can be placed a good distance from the workplace (normally the desk). This may seem like a sensible solution, but what is to be done about the extra irritation that is bound to arise as a result of these self-imposed inconveniences when one is in a hurry? The disadvantages may well outweigh the advantages. Are roundabout remedies really the best we can come up with?

The secret may lie in the added advantages that result from the introduction of new, varied routines. For example, if industry went back to the system that required people on the assembly line to go personally to fetch the parts they needed from the storeroom, they would have the opportunity both to move a little and to have more varied social contact. Is it possible that this may, in return, increase our comfort and efficiency more than any automated or unilateral process could?

We may be more inclined to accept the following minor "inconveniences" at work: files can be placed on a high shelf so we have to stand up and stretch to get them; the telephone can be put on a high counter so that phone calls are made standing up.

On a more fundamental level, can we actually impose new routines on modern people, as was possible in the Middle Ages when the Church wielded sufficient authority to implement new codes of conduct?
The best solution would be if the tasks we have to perform and our material surroundings themselves inspired us to use our bodies in more varied ways.

Are our lifestyles changing us physically?

Our friend and ancestor the ape has much stronger and longer arms than we, as well as toes that can grip – allowing him to move easily from tree to tree. With the passing of time, we climbed down from the trees, spending more and more time on the ground, and eventually our legs became our primary means of motion. Our arms grew weaker, and our legs became longer and stronger. Major changes in lifestyle led to physiological changes. What I wonder is how this bodily evolution will continue? Which groups of muscles will be maintained and developed, and which will shrink and wither as a result of our present lifestyles?

We are currently in a situation where our lifestyles are changing extremely rapidly, and our bodies simply cannot keep up. Do we even want our bodies to adapt? During the last hundred years or so, our muscles have grown weaker, and we have grown taller. Will this tendency continue?

We must remember that our bodies were originally suited for hunting and gathering food. Are the minimal and often repetitive muscle operations required to use a computer mouse enough to keep our bodies in prime condition? Will the active index finger operating the computer mouse evolve and grow larger?

Can developments in technology be expected to encourage a more active lifestyle? Perhaps in a few years' time when we can talk to our computers, we can return to dancing as we work. Will we go full circle and actually liberate ourselves from our tools and return to a condition such as existed in the era before Homo habilis? I think not. Luckily, there will always be plenty of jobs that have to be performed physically by people, and that is why it is important that those of us who design tools understand the needs of the human body.

Arms bore the brunt of movement when our ancestors lived in the treetops. Life on the ground meant we had to start using our legs to get around.